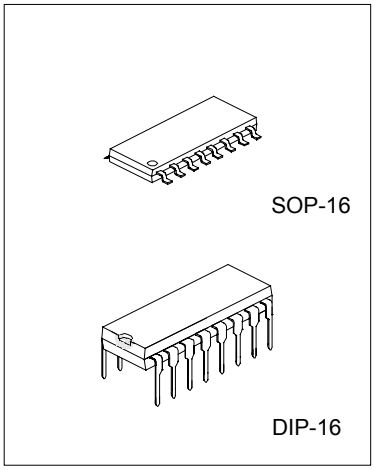
UTC UM602/A LINEAR INTEGRATED CIRCUIT

DUAL OPERATIONAL AMPLIFIER-DUAL COMPARATOR AND ADJUSTABLE VOLTAGE REFERENCE



DESCRIPTION

The UTC UM602/A is a monolithic IC that includes two op-amps, two comparators and a precision voltage reference. This device is offering space and cost saving in many applications like power supply management or data acquisition systems.

OPERATIONAL AMPLIFIERS

*Low supply current: 200μA/amp.
*Medium speed: 2.1MHz
*Low level output voltage close to Vcc⁻:0.1V typ.
*Input common mode voltage range includes ground

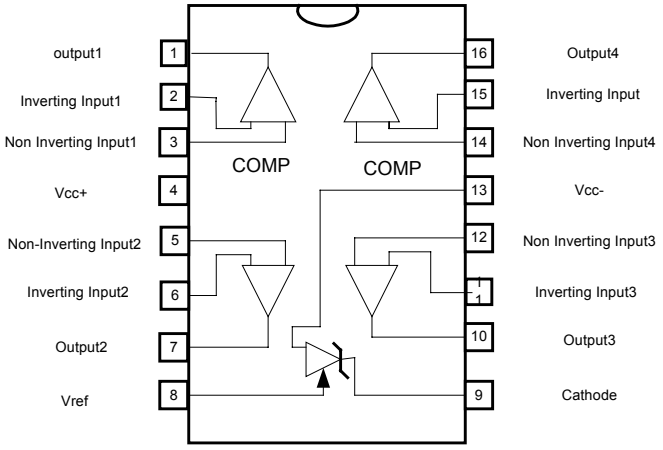
COMPARATORS

*Low supply current: 200μA/amp. (Vcc=5V)
*Input common mode voltage range includes ground
*Low output saturation voltage: 250mV(Io=4mA)

REFERENCE

*Adjustable output voltage: Vref to 32V
*Sink current capability: 1 to 100mA
*1% and 0.4% voltage precision
*LACTH-UP immunity

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	Vcc	36	V
Differential Input Voltage	Vid	36	V
Input voltage	Vi	-0.3 to +36	V
Operating Free-air Temperature Range	Toper	-40 to +125	°C
Maximum Junction Temperature	Tj	150	°C
Thermal Resistance Junction to Ambient (SOP package)		150	°C/W

ELECTRICAL CHARACTERISTICS (Vcc^+=5V, Vcc^-=0V, T_{amb}=25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Total Supply Current Tmin. ＜ Tamb ＜ Tmax.	Icc		0.8	1.5 2	mA

OPERATIONAL AMPLIFIERS

(Vcc^+=5V, Vcc=GND, R1 connected to Vcc/2,Tamb=25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Input Offset Voltage Tmin.＜= Tamb ＜= Tmax.	Vio		1	4.5 6.5	mV
Input Offset Voltage Drift	DVio		10		μV/°C
Input Bias Current Tmin.＜= Tamb ＜= Tmax.	Iib		20	100 200	nA
Input Offset Current Tmin.＜= Tamb ＜= Tmax.	Iio		5	20 40	nA
Large Signal Voltage Gain R1=10k, Vcc^+=30V Vo=5V to 25V Tmin.＜= Tamb ＜= Tmax.	Avd	 50 25	 100		V/mV
Supply Voltage Rejection Ratio Vcc=5V to 30V	SVR	80	100		dB
Input Common Mode Voltage Range Tmin.＜= Tamb ＜= Tmax.	Vicm	(Vcc^-) to (Vcc^+) -1.8 (Vcc^-) to (Vcc^+) -2.2			V
Common Mode Rejection Ratio Vcc^+=30V,Vicm=0V to (Vcc^+)-1.8V	CMR	70	90		dB
Output Short Circuit Current Vid=±1V,Vo=2.5V Source Sink	Isc	 3 3	 6 6		mA
High Level Output Voltage R_L=10kΩ Vcc^+=30V Tmin.＜= Tamb ＜= Tmax.	VoH	 27 26	 28		V
Low Level Output Voltage R_L=10kΩ Tmin.＜= Tamb ＜= Tmax.	VoL		100	150 210	mV
Slew Rate Vcc=±15V Vi=±10V,R_L=10KΩ,C_L=100pF	SR	1.6	2		V/μs
Gain Bandwidth Product R_L=10KΩ, C_L=100pF, f=100kHz	GBP	1.4	2.1		MHz

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Phase Margin R_L=10KΩ,C_L=100pF	Φm		45		Degrees
Total Harmonic Distortion	THD		0.05		%
Equivalent Input Noise Voltage f=1kHz	en		29		$\frac{nV}{\sqrt{Hz}}$
Channel Separation	Cs		120		dB

COMPARATORS (Vcc^+=+5V, Vcc=Ground, Tamb=25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Input Offset Voltage Tmin.<= Tamb <= Tmax.	Vio			5 9	MV
Input Offset Current Tmin.<= Tamb <= Tmax.	Iio			50 150	nA
Input Bias Current Tmin.<= Tamb <= Tmax.	Iib			250 400	nA
High Level Output Voltage Vid=1V,Vcc=Vo+30V Tmin.<= Tamb <= Tmax.	I_{OH}		0.1	 1	nA μA
Low Level Output Voltage Vid=-1V,Lsink=4mA Tmin.<= Tamb <= Tmax.	V_{OL}		250	 400 700	mV
Large Signal Voltage Gain R1=15K,Vcc=15V,Vo=1 to 11V	Avd		200		V/mV
Output Sink Current Vid=-1V,Vo=1.5V	I_{sink}	6	16		mA
Input Common Mode Voltage Range Tmin.<= Tamb <= Tmax.	V_{icm}	0 0		Vcc^+ -1.5 Vcc^+ -2	V
Differential Input Voltage	Vid			Vcc^+	V
Response Time –(note1) R1=5.1k to Vcc^+, Vref=1.4V	t_{re}		1.3		μs
Large Signal Response Time Vref=1.4V,Vi=TTL,R1=5.1k to Vcc^+	trel		300		ns

Note1: The response time specified is for 100mV input step with 5mV overdrive.
For larger overdrive signals, 300ns can be obtained.

VOLTAGE REFERENCE

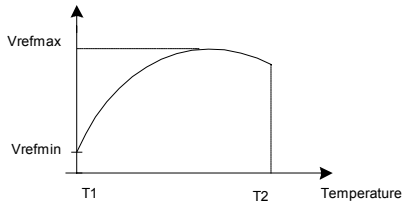
PARAMETER	SYMBOL	VALUE	UNIT
Cathode to Anode Voltage	V_{KA}	Vref to 36	V
Cathode Current	I_K	1 to 100	mA

ELECTRICAL CHARACTERISTICS (Tamb=25°C, unless otherwise specified)

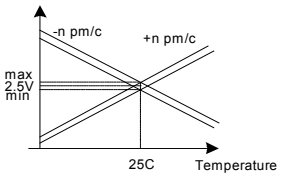
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Reference Input Voltage – (figure 1) – Tamb=25°C	Vref	 UM602, V_{KA}=Vref, I_K=10mA UM602A, V_{KA}=Vref, I_K=10mA	 2.475 2.490	 2.500 2.500	 2.525 2.510	V

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Reference Input Voltage Deviation Over Temperature Range – (figure 1, note 1)	△Vref	V_{KA}=Vref, I_K=10mA, Tmin.＜= Tamb ＜= Tmax.		7	30	mV
Temperature Coefficient of Reference Input Voltage-(note 2)	$\frac{\triangle Vref}{\triangle T}$	V_{KA}=Vref, I_K=10mA, Tmin.＜= Tamb ＜= Tmax.		±22	±100	ppm/°C
Ratio of Change in Reference Input Voltage to Change in Cathode to Anode Voltage –(figure2)	$\frac{\triangle Vref}{\triangle V_{KA}}$	I_K=10mA,△V_{KA}=36 to 3V		-1.1	-2	mV/V
Reference Input Current –(figure2)	Iref	I_K=10mA.R1=10kΩ, R2=∞ Tamb=25°C Tmin.＜= Tamb ＜= Tmax.		1.5	2.5 3	μA
Reference Input Current Deviation Over Temperature Range-(figure 2)	△Iref	I_K=10mA, R1=10kΩ, R2=∞, Tmin.＜= Tamb ＜= Tmax.		0.5	1	μA
Minimum Cathode Current for Regulation-(figure1)	Imin	V_{KA}=Vref		0.5	1	mA
Off-State Cathode Current-(figure 3)	Ioff			180	500	nA

Notes: 1. △Vref is defined as the difference between the maximum and minimum values obtained over the full temperature range.
△Vref=Vrefmax –Vrefmin



2. The temperature coefficient is defined as the slopes (positive and negative) of the voltage vs temperature limits whithin which the reference voltage is guaranteed.



3.The dynamic Impedance is defined as $|Z_{KA}| = \frac{\triangle V_{KA}}{\triangle I_K}$

Figure 1: Test Circuit for V_{KA}=Vref

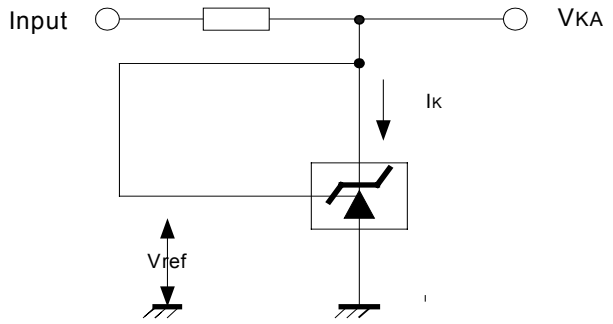


Figure 2: Test Circuit for V_{KA}＞Vref

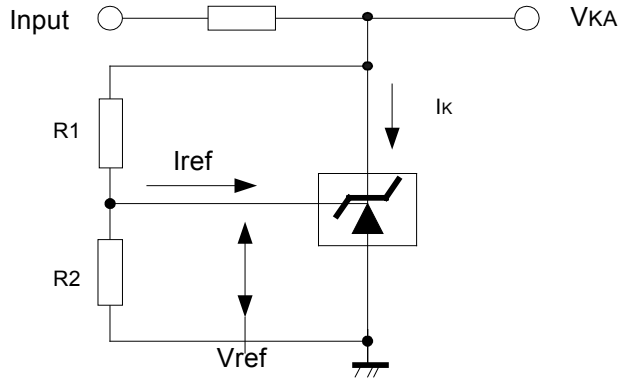


Figure 3: Test Circuit for I_{off}